

REMARKS

Present Status of the Application

The Office Action dated January 6, 2003 rejected claims 1-9 under 35 U.S.C. 102(b) as being anticipated by Bugosh, USPN 6,378,646. Furthermore, claims 1,2,4-6, 8, and 9 are rejected under U.S.C. 102(b) as being anticipated by Sugino et al., USPN 5,590,732. New claims 10 and 11 have been added for consideration. No new matter is introduced with the newly added claims. Claims 1-11 remain pending.

Reconsideration of the rejection to the said pending claims is respectfully requested.

Summary of Applicants' Invention

The Applicant's invention is directed to a ball screw mechanism comprises a screw shaft, a nut and balls. The nut has a cylindrical portion in the axial middle on the outer peripheral surface thereof that becomes a fitting surface for fitting in a sleeve, and small diameter step portions in the opposite axial sides on the outer peripheral surface thereof that become non-fitting surfaces not fitting in the sleeve. A portion of a wheel steering shaft is provided with the screw shaft, and a plurality of balls are disposed in a rolling way defined between a thread groove formed in the outer periphery of the screw shaft and a thread groove formed in the inner periphery of the nut.

Response to Rejection Under 35 U.S.C. 102(b)

Claims 1-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Bugosh, USPN 6,378,646. Claims 1, 2, 4-6, 8, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugino et al. The rejections to the claims are respectfully traversed below.

In the Office Action, the Examiner stated that "Bugosh shows an electric power steering system with a ball screw 24 and nut 66. The nut is generally cylindrical. It has a support contacting middle region 82 and non-fitting surfaces on opposite sides of the middle region."

Applicant asserts that Bugosh shows a pivotal ball-nut connection for a power assisted steering system in which the ballnut 66 is pivotal relative to the rotatable member 34 in a direction transverse to the axis. On Col. 4, lines 46-54, Bugosh clearly states that "the pivot ball 70 connecting the ballnut 66... allows the ballnut 66 to pivot, or swivel, relative to the rotatable member 34 and traverse to the axis."

The present invention, however, does not allow for the nut 14 to pivot due to the firm support with the sleeve 11 (page 10, lines 1-5 of the Specification). As such, the disclosure of Bugosh clearly does not anticipate the present invention, as Bugosh teaches away from the nut 14 engaging with the sleeve 11 in a manner as to have the cylindrical portion 14a to be firmly supported in the sleeve 11 as disclosed in the present invention. More particularly, in the present invention the nut 14 is press-fitted only at its central portion in the support member, or the sleeve 11, this prevents any wrenching or twisting movements between the screw shaft and nut. The paragraph beginning on page 9, line 28, and the paragraph beginning on page 11, line 7, of the specification provide further support to the Applicant's assertion.

In addition, Applicants disagree with the last statement in section 2 of the Detailed Action that "The not-fitting surfaces are tapered at least at their axial end portions." As no reference of this can be found in Bugosh.

For the above reasons, Applicant asserts that Bugosh does not disclose the features of the present invention and cannot anticipate claims 1-9.

Regarding the rejection of claims 1, 2, 4-6, 8, and 9 under 35 U.S.C. 102(b) as being anticipated by Sugino et al., Applicant would like to point out the following disclosure from Sugino et al. Col. 5, lines 45-53 of Sugino et al. states "The joint pipe 50 is slightly rockably supported at one end in the housing 1 by an automatic aligning bearing 43 for rocking movement about a point 01 at the center of the automatic aligning bearing 43. The nut 51 is slightly rockably held in the opposite end, shaped as a spherical bushing, of the joint pipe 50 for rocking movement about a point 02. The spherical bushing of the joint pipe 50 allows an angular displacement or positional error to be absorbed between the nut 51 and the housing 1." Clearly, from the disclosure of Sugino et al., angular displacement or positional error and rocking movement about point 02 are allowed, which is contrary to the present invention.

Applicant asserts that Sugino et al. teach away from the present invention. As such, claims 1-2, 4-6, and 8-9 are not anticipated by Sugino. Reconsideration of the rejections to the claims, under 35 U.S.C. 102(b), is respectfully requested.

Concerning Newly Added Claims 10 and 11

The newly added claims 10 and 11 are fully supported by the disclosure of the Specification (page 10, lines 1-5). The tight-fitting feature allows for the cylindrical portion 14a to be firmly supported in the sleeve 11, which is not taught by the cited references.

CONCLUSION

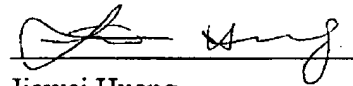
For at least the forgoing reasons, it is believed that pending claims 1-9 and newly added claims 10 and 11 are in proper condition for allowance. If the Examiner believes

that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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